"Fourth Generation" Universities and Regional Development

Zuti, Bence; Lukovics, Miklós

Veröffentlichungsversion / Published Version
Konferenzbeitrag / conference paper

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Bence Zuti, Miklós Lukovics

Introduction

Nowadays the competitiveness of regions is affected and altered by globalization and other background processes that serve as arrangers of regional structure and for this reason they deserve attention. In the global competition, **immaterial assets** like knowledge or social capital become key aspects, and engines of economic development. In regional studies, knowledge is identified as a **crucial factor of regional development**. **Knowledge became the main asset of production**, it is considered as a new engine of economic development, hereby the role of knowledge, innovation, technology and learning is necessary to be reconsidered. This can also be derived by the fact that the **presence of innovation** fundamentally determines the competitiveness of regions and continuous innovation is required to obtain competitive edge (Lengyel 2000). We can point out that the competitive edge of developed economies mainly relies on their ability to create and utilize knowledge (Grosz – Rechnitzer 2005).

In this study, after considering these challenges, we would like to answer **what the universities can do (by representing active or passive behavior) for the purpose of enhancing regional competitiveness**. To answer this question, first we examine the connection between universities and competitiveness, where the highlight of

main definitions will take place. After this we will analyze the pyramid model of regional competitiveness. Then the analysis of the universities' social and economic environment will take place in the context of fourth generation universities with the help of theoretical elements like the diamond model of universities, the Triple Helix model. Finally we will attempt to specify the „components", success factors that can contribute to the activity of maximizing local potential and the enhancement of regional competitiveness.

1 Competitiveness and universities

Nowadays it is more and more accepted that not only enterprises but **different regions also compete** with each other. Competitiveness, defined as the level of holding on to competition, has become a **main definition** of economy and business sciences due to the processes and unique characteristics of globalization.

Of all definitions of competitiveness available, in this study we will use the **mainstream unified definition of competitiveness**: *„The ability of companies, industries, regions, nations and supranational regions to generate, while being exposed to international competition, relatively high income and employment levels"* (EC 1999, p. 75., Lengyel 2000, p. 974.).

Hereinafter the review of demonstrational models will occur that will give us an insight in **development aspects** by expanding the definition of competitiveness, and lively describing the wide-scale factors affecting regional competitiveness.

1.1 The role of universities in the pyramid model of competitiveness

The pyramid model of competitiveness is based on the unified definition of competitiveness, which is a handy definition, as is emphasizes two measurable economic categories: the level of income and employment (Lengyel 2000). It is applicable to enterprises and regions of different levels, so it is a complex definition. On the peak of the model we can find the ultimate goal, the enhancement of the standard of living and the quality of life.

The factors affecting competitiveness can be divided into two groups depending on their connections to economic development. One of them are mainly economic factors, so called development factors, that have an effect on regional economic development in the short-term and their enhancement can directly improve the competitiveness of operating enterprises in the region. The other group consists of factors that are mainly beyond the economy, they explain the region's competitiveness in the long-term but economic development programs can barely affect them (Lengyel 2003). Among the basic categories and development factors the model represents the influential factors that can be connected to innovation (Figure 1).

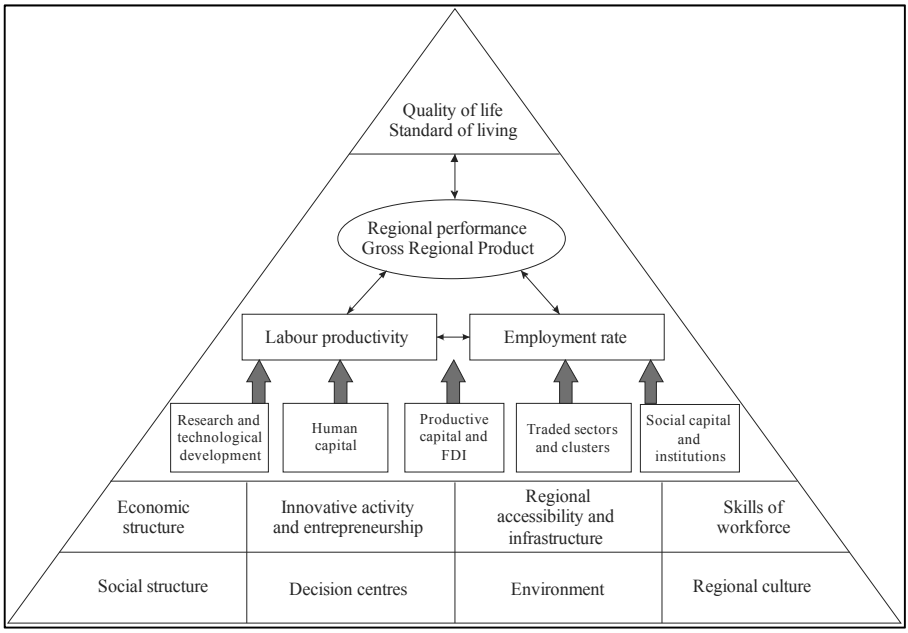

Figure 1: The pyramid model of regional competitiveness
Source: Lengyel 2000.

According to the logic of the model, the improvement of development factors has a direct effect on basic categories and the competitiveness of the region as a result. The **„Research and technological development"** is one of the most important development factors of the model, matching with the logical structure of regional economic development. Universities have an emphasized role in the enhancement of this development factor.

1.2 The competitive role of universities in different types of regions

The challenges of the knowledge-based economy can only be successfully dealt with if we sharply separate the regions where knowledge creation occurs from the ones where knowledge is utilized, as this fundamentally determines their future opportunities.

In knowledge-based economies the economic role of each region type is different, a **reorganization of regional division of labor** can be noticed (Lengyel 2003). The opportunity of regional development depends mainly on the „**critical mass**", essentially the advantages of the agglomeration. For this reason during the analysis of regional competitiveness it is practical to separate regions along urban and rural dimensions. This comes from the realization that the knowledge-based sectors **demand special conditions and environment**, from which one of the most important things is the proximity to knowledge bases that can only be observed in urban areas (Begg 2002).

2 The effects of universities regarding economic development

To effectively reconsider the effects of universities regarding regions, at first it is practical to frame out the logical structure of concepts (Figure 2). The role of universities from an economic aspect has been widely analyzed. The definition of competitiveness has a clear relevancy in this contexture. According to this the main goal of economic development is to increase the welfare of the inhabitants of the region through competitiveness (or productivity according to Porter) and counting on the ability of innovation (Lengyel 2003).

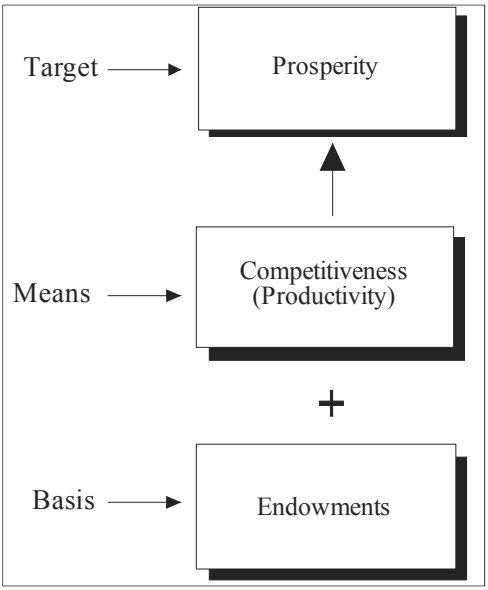

Figure 2: The logical structure of regional economic development

Source: Lengyel (2002)

According to Wissema (2009) nowadays the second big transition of universities takes places, which trend to the formation of so called **third generation universities** (Table 1). In this phase, universities not only create professionals (first generation universities), professionals and scientists (second generation universities), but **professionals, scientists and entrepreneurs** at the same time (third generation universities).

Table 1: Some characteristics of first, second and third generation universities

Aspect	**First generation universities**	**Second generation universities**	**Third generation universities**
Goal	Education	Education and research	Education, research and utilization of knowledge
Role	Protection of truth	The cognition of nature	Creation of added value
Output	Professionals	Professionals and scientists	Professionals, scientists and entrepreneurs
Language	Latin	National	English
Management	Chancellor	Part-time scientists	Professional management

Source: Own construction based on Wissema (2009)

We can state that the enhancement of the competitiveness of a region can be expected from third generation universities, as this is where not only education and research are significant but the utilization of knowledge is also crucial. As a result the connection between industry and universities deepens, so there is an opportunity of the local utilization of knowledge created in universities, which enhances the competitiveness of the region through the enhancement of the competitiveness of enterprises.

3 The local economic and social environment of universities

Knowledge-based society inevitably involves the appraisement of human capital, as the competitiveness of economies highly depend on the quantity and quality of human resources available. The key elements of training human capital are universities, which have an increasing role in developed economies.

3.1 Fourth Generation universities

It is typical in regions with developed economic background that universities progressively augment their traditional activities with third mission elements due to their increased role in society and economy.

Nowadays modern universities have to fulfill the needs and demands of knowledge-based society. A question inevitably emerges: what conditions must universities fulfill to be able to evolve locally and create and maintain a global presence? Three approaches help us to answer this question: fourth generation universities, the diamond model of universities and the Triple Helix model.

Besides the well-known typology of Wissema that mentions three generations of universities, there is a new, fourth generation approach present in literature. The accurate characteristics of fourth generation universities are in an embryonic stage, their attributes require consideration. The fourth generation university fits properly in the progress of university development. The most significant difference is that these universities have a much more notable strategic approach and they are able to shape their environment proactively (Pawlowski 2009).

3.2 The diamond model of modern universities

In accordance with the Porter diamond model that systematizes the microeconomic business environment of enterprises, we can state that the success of universities depends on several factors. We are able to translate the determinants of the original diamond model in the context of universities. With this we can define the factors contributing to universities' competitive edge (Figure 3). The determinants necessarily include updated content.

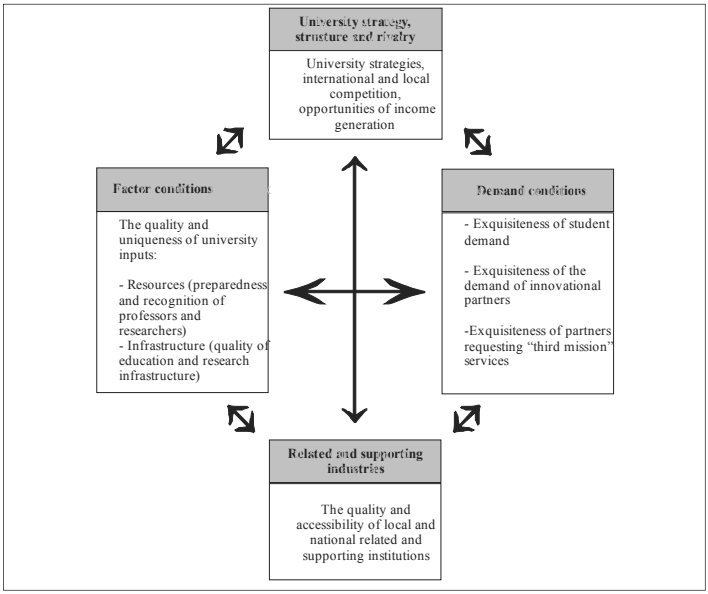

Figure 3: The diamond model of modern universities
Source: Own construction based on Porter

In connection with **factor conditions** the human resources and infrastructure have the greatest significance, so here we can highlight the importance of both **hard** and **soft** elements. Here those factors

are located that serve as a foundation of the competitiveness of universities. If professors are more qualified and if the infrastructure is more modern, the universities can accomplish a better position on the virtual global rankings of universities.

Demand conditions mean demand for all factors that serve as an output of the university. The sophisticated local demand motivates the universities from aspects of education, research and third mission. These are necessary but not sufficient requirements of internationally recognized competitiveness. In accordance with the input side it is important that highly qualified graduates with sophisticated knowledge should appear on the labor market on the output side. Demand conditions determine both quantity (critical mass of students) and quality (correspondence with students' needs) dimensions. It is also important to be able to attract the best national and foreign students.

Related and supporting industries determine partners that can contribute to the success of universities directly or indirectly. Universities tend to have strong relations with the business sector and other universities or research facilities.

In connection with **university structure and rivalry** it is fundamental that institutional documents should be written reckoning the characteristics of the local area, as this is a crucial element of success.

3.3 The connections between universities, industry and government

The main approach of the Triple Helix concept is that the actors of the university-industry-government triangle share some of their activities with each other; however we are able to distinguish their main functions (Etzkowitz 2008). This connection results in a novel approach on a regional level which can act as a foundation of knowledge-based economy and cognition. In the Triple Helix model the university possesses the main role of education, government is an actor of social aspects and industry acts as engine of economy. On the whole we can point out that the Triple Helix model highlights the creative role of universities in regional economies (Gunasekara 2004).

Within the framework of third mission, developing the economy and enhancing competitiveness are becoming fundamental activities. To achieve this, universities must target the creation and intensification of networks towards economy and government. This trilateral network system is called Triple Helix model (Lengyel B. 2004).

As a result of education, universities train highly qualified workforce, they create new possibilities during research. The common part of the two procedures is that with them we are able to shape the future considering present needs (Boulton – Lucas 2011).

As a standard, universities have a fundamental role in the Triple Helix model. However the activities represented by universities are revalorizing. Besides we must point out that the creation and maintenance of knowledge-based economy would be constantly clogging.

4 The components of a successful fourth generation university

As a result of analyzing the competitive role, the potential economic development effects and the economic-social environment of universities we can create the virtual model of successful fourth generation universities.

The characteristics of successful universities can be determined, as the contemporary global higher education rankings have their own criteria and methodology regarding successful universities from the aspect of education and research. The success factors in connection with third mission can also be determined through the analysis of university strategies[1].

The feature of the model is that is systematizes and demonstrates the success factors determined by global higher education rankings and international benchmarks. The virtual model is located in a local area, as the embedment in local economy and society is a necessary but not sufficient factor of success. The foundation of the model is composed by the determinants of the diamond model of universities. This basically determines the effective operation of the university (e. g. the profitability of financial resources, highly educated human capital and infrastructure). The two pillars represent the traditional activities of education-research and third mission. In these pillars the most important success components are represented, that contribute to the efficient operation of the university if integrated properly. The education-research pillar and third mission pillar both consist of 4-4 components. It is important to point out that the location of these components within the pillars is not hierarchic.

[1] In connection with the virtual model represented in the study, we must point out that the analysis of university strategies is the work of Gabriella Molnár. The virtual model of an internationally successful university was jointly created by Bence Zuti and Gabriella Molnár and the related study has been awarded 2nd prize at the Regional Studies II division during the Economy Section of the 31st *National Scientific Students' Associations Conference.*

The first component of the **education-research pillar** is **mobility**. When discussing mobility we can talk about student and research associate dimensions. With internationalization a fourth generation university has to support mobility of students. The possession of a wide system of networks is necessary to ensure opportunities and mobility programs for students with adequate financial sponsorship. Besides openness regarding foreign students is also important.

The second component of the pillar is the **programme portfolio** consisting of BA/BSc, MA/MSc and PhD programmes, vocational trainings. In connection with the programme portfolio we can highlight two extreme dimensions, which are „pull" and „push" cases. The **pull approach** means that the demand is given, so the programme portfolio adapts to this demand. The **push approach** means the opposite, namely that the institution creates the demand for the portfolio.

The third component of the pillar is **innovation**. Besides education, research is a fundamental activity in the everyday life of universities. In case of a fourth generation university it is important that research results should possess significant practical value and with it we should be able to solve real problems. Nowadays constant innovation, new ideas and solutions are inevitable, as they can be key aspects of the success of enterprises. Through excellent quality research and continuous innovation the university can contribute to the development and support of regional enterprises.

The fourth and final component of the education-research pillar is **parameters and performance** which can be connected to all of the indicators of global higher education rankings.

The first component of the **third mission pillar** is **transfers**. We can distinguish knowledge transfer and technology transfer. The

approach of knowledge transfer trends towards tacit, while technology transfer trends to codified knowledge and the flow of information.

The second component of the pillar is **connections**. We can discuss internal and external. Internal connections on national level mean connections of university-industry-government (Triple Helix model), while external conditions are determined as international networking activities from the aspect of the university-industry-government. It can be advantageous if they manage to connect with business actors and local organizations. In this case the induction of significant economic effects emerges as a primary goal.

The third component of the pillar is the **adaptive structure and system**. This can be defined as a flexible organizational structure that considers planning, organizing, directing and monitoring in a way that recognizes the most efficient operation opportunities in the local area.

The fourth component of the third mission pillar is **services**. As a result, universities can widen their basis of income, besides it can contribute to the development of local economy, moreover it can support and improve enterprises with activities like counseling.

As a result, we can create the virtual model of modern universities (Figure 4).

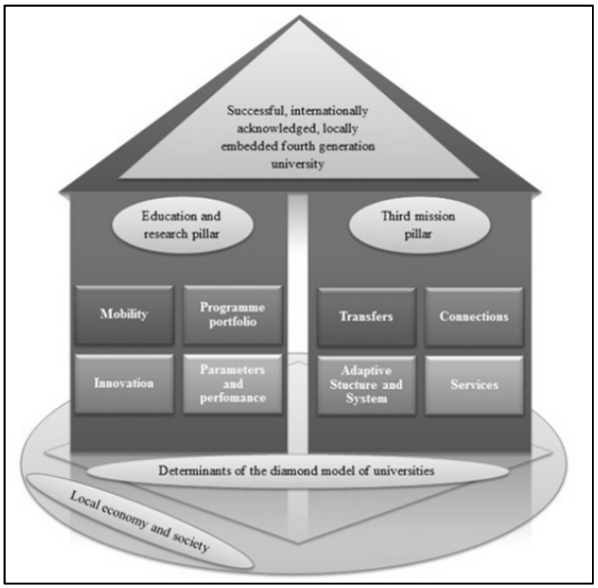

Figure 4: Virtual model of an internationally successful university
Source: Own construction

The top element of the virtual model is the strategic goal of the university, namely the achievement of international acknowledgement, local embedment within the framework of fourth generation universities. The vision of modern universities is the attainment and maintenance of national and global welfare through the successful adaptation of this framework The concept of a successful, locally integrated fourth generation university gives an answer to the question „What?", however the question „How?" remains open. This can be solved and answered by adapting the ultimate strategic goal considering the characteristics of the local economy and society, namely we reconfigure the added value of universities regarding the attributes of the local area.

5 Conclusion

The main goal of this sturdy was to answer the proposed problem: **what the universities can do (by representing active or passive behavior) for the purpose of enhancing regional competitiveness?**

To answer this question, we divided our study into three main parts. First we examined the connections between universities and competitiveness with the help of the pyramid model of regional competitiveness. Afterwards we analyzed the economic and social environment of universities with the diamond model of modern universities and the Triple Helix model. This was done in the context of fourth generation universities. Finally we introduced the virtual model of an internationally successful modern university that consists of success components. These components can contribute to the optimization of local opportunities so universities can gain international acknowledgment. By following this framework universities may affect and enhance the competitiveness of a region.

An appropriate answer can be given regarding the proposed problem: universities are able to positively contribute to the competitiveness of their regions by considering strategic thinking and third mission activities with the help of tools of economic development. It is important to highlight that the model introduced in the study is a framework that is able to foster the contribution of universities regarding local economic development. The most appropriate results may materialize if the university recognizes and considers the needs of local economy and society.

The society and economy is in a transition from quantity production to quality production. In this paradigm shift creative society has the best chance of shaping the future through universities.

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